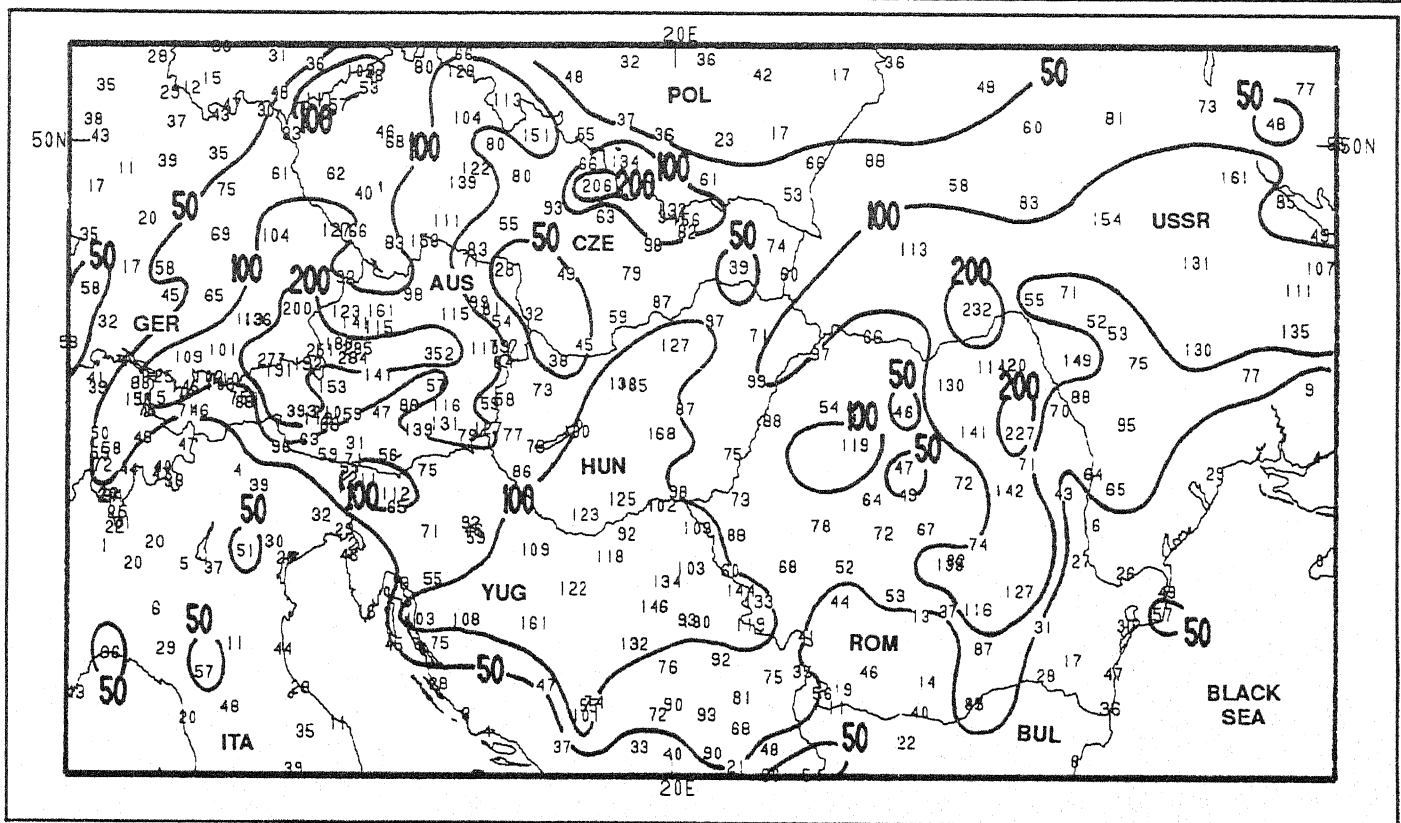


WEEKLY CLIMATE BULLETIN

No. 91/31

Washington, DC

August 3, 1991



Torrential rains have inundated parts of Europe during the past two weeks, drenching areas from southern Germany southeastward to the Black Sea. Over 200 mm of rain deluged the area around Salzburg, Austria, taking at least five lives and closing dozens of roads. The swollen Danube River was closed to ships between Linz and Vienna as the flooding was the worst in Austria in 30 years. In addition, heavy rains in northeastern Romainia caused a dam to burst, washing away entire villages and claiming over a hundred lives, according to press reports. Large areas of cropland were ruined in Romania's Moldavia region. In the western Ukraine, 11 people were reported killed or missing after five villages were flooded. The heavy rains also caused an accident at an oil refinery southwest of Lvov, sending oil products into the Dniester River. Farther east, a large waterspout generated waves up to 24 feet high that pounded the resort town of Tuapse along the northeastern Black Sea coast. Several lives were taken by the freakish conditions.



UNITED STATES DEPARTMENT OF COMMERCE
 NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
 NATIONAL WEATHER SERVICE-NATIONAL METEOROLOGICAL CENTER
CLIMATE ANALYSIS CENTER



WEEKLY CLIMATE BULLETIN

This Bulletin is issued weekly by the Climate Analysis Center and is designed to indicate, in a brief concise format, current surface climatic conditions in the United States and around the world. The Bulletin contains:

- *Highlights of major climatic events and anomalies.*
- *U.S. climatic conditions for the previous week.*
- *U.S. apparent temperatures (summer) or wind chill (winter).*
- *Global two-week temperature anomalies.*
- *Global four-week precipitation anomalies.*
- *Global monthly temperature and precipitation anomalies.*
- *Global three-month precipitation anomalies (once a month).*
- *Global twelve-month precipitation anomalies (every three months).*
- *Global three-month temperature anomalies for winter and summer seasons.*
- *Special climate summaries, explanations, etc. (as appropriate).*

Most analyses contained in this Bulletin are based on preliminary, unchecked data received at the Climate Analysis Center via the Global Telecommunications System. Similar analyses based on final, checked data are likely to differ to some extent from those presented here.

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GLOBAL CLIMATE HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF AUGUST 3, 1991

1. Eastern and Central United States:

COOLER AIR MOVES IN, BUT DRYNESS PERSISTS.

Temperatures returned to near normal throughout the region, bringing an end to the recent warm spell [Ended after 10 weeks]. Little or no rain, however, was again measured across the central and northern mid-Atlantic, Ohio Valley, and Corn Belt as moisture deficits increased. Scattered moderate rains (15–50 mm) dampened the central Appalachians while central and southern Virginia received more substantial relief (50–80 mm of rain). Since mid-June, deficits of 50–100 mm have accumulated at most locations from the central and northern mid-Atlantic westward to the central Corn Belt as well as through the middle Mississippi Valley and south-central Plains, with scattered 115–145 mm shortfalls measured in western Illinois and Iowa [10 weeks].

2. Central and Southern High Plains:

ABUNDANT MONSOONAL RAINS CONTINUE.

Many locations received an additional 25–75 mm of rain, with isolated amounts reaching 120 mm. Several spots have received 2 to 3 times the normal rainfall during the last 5 weeks, with some places accumulating 85–160 mm above normal rainfall. Spotty flash flooding continued to plague portions of the region, according to the Office of Hydrology [5 weeks].

3. Central Mexico:

WET SPELL ENDS.

Scattered totals of 20–60 mm dampened parts of the region, but most areas recorded near or below normal rainfall totals as widespread moisture surpluses diminished [Ended after 6 weeks].

4. The Sahel:

SLIGHTLY HEAVIER RAINS OBSERVED, BUT SPOTTY MOISTURE DEFICITS REMAIN.

Northern Senegal and southwestern Mauritania received 20–50 mm of rain while similar amounts fell across northern and western Burkina Faso (20–65 mm) and east-central Sudan (10–40 mm). Despite the needed moisture, however, much of eastern Sudan between 10°N and 13°N has measured 100–130 mm below normal rainfall since mid-June. Sizable deficiencies of 75–185 mm are more scattered

across northern Senegal, southwestern Mauritania, and northern and western Burkina Faso [7 weeks].

5. Central and East-Central Europe:

HEAVY RAINS GENERATE FLOODING.

Weekly rains of 100–200 mm have pounded portions of Austria, Romania, and the central Ukraine while 30–90 mm fell elsewhere. Some locales have experienced flooding that has inundated farmlands and washed out villages in conjunction with the storms, according to press reports (see Front Cover) [2 weeks].

6. Central Pakistan:

ABNORMALLY DRY RAINY SEASON CONTINUES.

A second consecutive week of moderate to heavy rains eliminated widespread moisture shortfalls across central and northwestern India and induced some flooding (see page 8), but very dry conditions (115–180 mm shortfalls since mid-June) continued through central Pakistan. Only 10–20 mm of rain fell last week despite much higher totals (50–100 mm) just north and east of the afflicted region [9 weeks].

7. The Koreas, the Yangtze River Valley, and Northeastern and South-Central China:

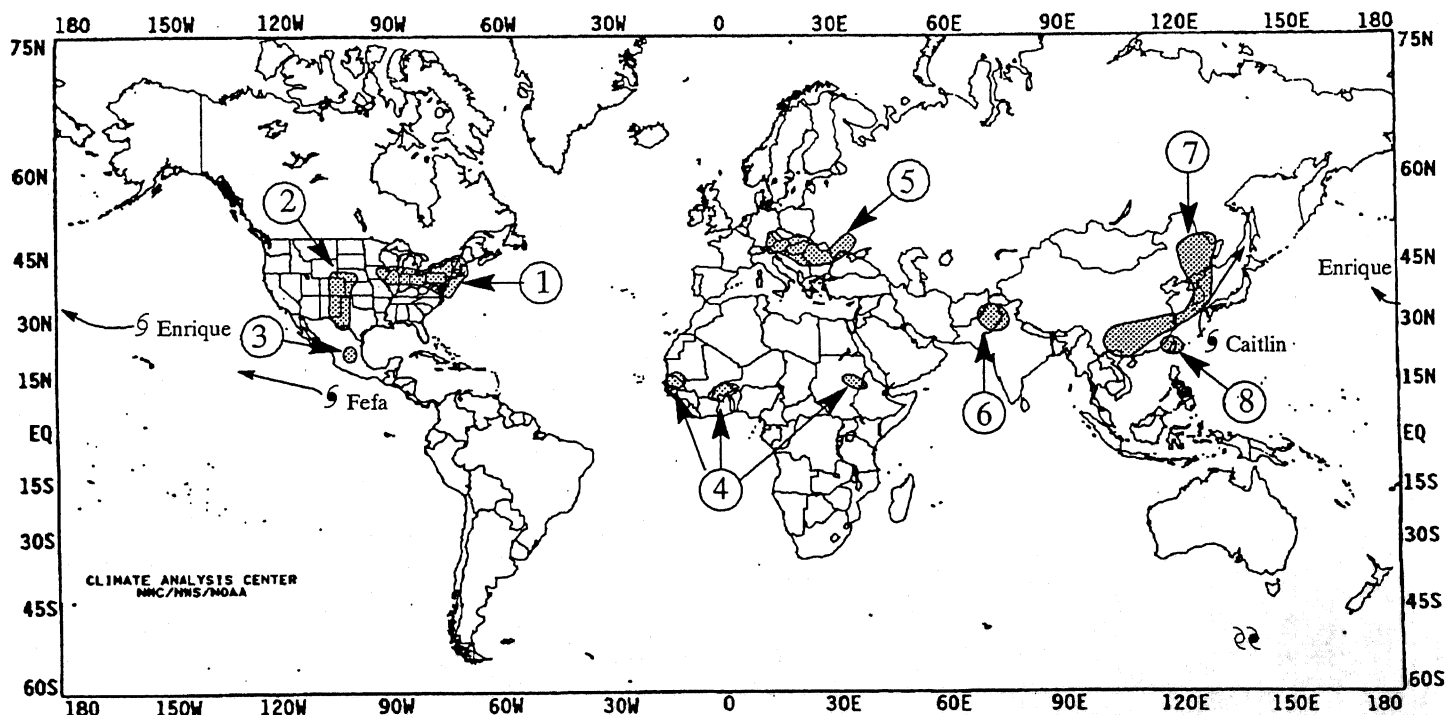
ANOTHER WET WEEK.

Most of Heilungjiang measured 40–100 mm of rain while slightly higher amounts (up to 150 mm) soaked parts of the Koreas, the Yangtze River Valley, and south-central China. Much of southern South Korea was soaked by 125–250 mm, most of which fell as Typhoon Caitlin moved northeastward through the Korea Strait. Since mid-June, 100–315 mm of above normal rainfall has been measured across much of the Koreas and the Yangtze River Valley, with scattered departures reaching 595 mm in south-central Hubei province [9 weeks].

8. Taiwan and Southeast Fujian:

HEAVY RAINS POUND SOUTHERN TAIWAN, BUT STILL DRY FARTHER NORTH.

Up to 300 mm of rain deluged the southern half of Taiwan, bringing significant relief from the recently rejuvenated dry spell, but most of the northern half of the island as well as southern Fujian received only scant rainfall totals (10–40 mm) as sizable moisture deficits (up to 420 mm for six weeks) persisted in those regions [Ending after 5 weeks].



EXPLANATION

TEXT: Approximate duration of anomalies is in brackets. Precipitation amounts and temperature departures are this week's values.
 MAP: Approximate locations of major anomalies and episodic events are shown. See other maps in this Bulletin for current two week temperature anomalies, four week precipitation anomalies, long-term anomalies, and other details.

UNITED STATES WEEKLY CLIMATE HIGHLIGHTS

FOR THE WEEK OF JULY 28 – AUGUST 3, 1991

Heavy rains deluged much of the Southeast and portions of the middle Atlantic this week. Strong thunderstorms, packing copious amounts of rain, strong wind gusts, and tornadoes prevailed from Florida to parts of Virginia. Rainfall amounts exceeded 10 inches in South Carolina. Heavy rains also boosted the July precipitation total at Columbia, SC to 17.46 inches, making it the wettest month on record. Some storms dumped torrential rain in short time intervals which resulted in flash flooding. Up to 7 inches of rain deluged Rockridge, NC in 3 1/2 hours, washing out a section of State Road 1123. A few storms spawned tornadoes in North Carolina and Florida. Severe weather was not confined to the East however, portions of the upper Midwest, Great Plains, Great Basin, and the Far West were affected by soaking rains, flash flooding, damaging winds, hail, and fatal lightning. Rare summer showers and thunderstorms moved through coastal southern California, producing record July 30th and July monthly rainfall records in San Diego and Los Angeles, CA, respectively. In addition, the storms knocked out power to nearly 100,000 customers in San Diego and created flash flooding in La Mesa, CA forcing the evacuation of nearly two dozen people in a trailer park, according to press reports. Meanwhile, unseasonably cool weather settled across the upper Midwest, Great Lakes, Ohio Valley, and the Northeast. Temperatures were as much as 5°F below normal across parts of Minnesota and Wisconsin while record lows were observed in the Ohio Valley and New York where lows dipped into the forties. Elsewhere, hot weather enveloped much of the Far West and central U.S. as readings soared over 100°F before shifting eastward by the weekend. Several record highs were established from California to Maryland. Oppressive conditions affected the mid-Atlantic on Saturday as apparent temperatures topped 110°F in northern Virginia. Heavy rains soaked southeastern Alaska and eastern Hawaii. Nearly 10 inches of rain fell at Yakutat, AK while over 4 inches was recorded at Hilo, HI.

The week commenced with unusually cool weather across the upper Midwest, Ohio Valley, and Northeast. Temperatures at Youngstown, OH dipped to a record low of 49°F on Sunday morning. In addition, parts of the upper Midwest experienced autumn-like conditions with highs reaching to just over 60°F. Both Rochester and Minneapolis, MN observed record low highs on Sunday as readings hit 63°F and 64°F, respectively. Farther south, wet weather prevailed across much of the Southeast and mid-Atlantic due to a stalled cold front and weak tropical disturbance. Thunderstorms bearing brief and intense rains doused the Shenandoah Valley in Virginia and much of the Carolinas, Georgia, and Florida. Flash flooding was reported from parts of North Carolina to Florida. Farther west, hot weather dominated from the Great Plains to the Far West. Highs topping 100°F were recorded from Kansas to the interior valleys of California. Lake Havasu, AZ recorded a steamy morning low of 96°F on Tuesday and eventually warmed to a high of 116°F later in the day. The heat produced record highs from California to Wyoming. Elsewhere, a cold front swept across the northern Plains and into the upper Midwest, spawning severe weather from South Dakota to Minnesota and ushered in cooler conditions for the northern Rockies.

During the last half of the week, the cold front in the Midwest progressed rapidly eastward while the trailing edge stalled across the central Plains. Strong thunderstorms erupted along the front, dumping scattered heavy rain and generating strong wind gusts that downed trees and power lines in the Midwest. Cooler weather overspread portions of the Midwest by the weekend. The high in Chicago, IL was nearly 30°F cooler on Saturday than the previous day when the mercury topped 100°F. The leading edge of cooler air eventually pushed off the New England coast. In sharp contrast, hot weather entrenched over the southern and central Plains worked eastward. Record highs were recorded from Kansas to Maryland. The heat combined with high humidities in the mid-Atlantic to produce oppressive conditions and apparent temperatures around 105°F. Farther west, strong thunderstorms dumped heavy rain, causing flooding and mudslides in portions of Utah with as much as four feet of water covering some roads near Escalante and Boulder, UT. One storm, in Utah, produced lightning that claimed the lives of two people and injured a third. In Alaska, unseasonably cold weather affected southwestern Alaska. Bethel, AK reported a record low of 41°F Friday morning.

According to the River Forecast Centers, the greatest weekly totals (more than 2 inches) fell across the Southeast, portions of the mid-Atlantic, and scattered locations in the upper Midwest, the deep South, north-central and southeastern Texas, Kansas, the central Rockies, Southwest, southeast Alaska, and eastern Hawaii (Table 1). Light to moderate amounts were measured in most of New England, the remainder of the mid-Atlantic and upper Midwest, the Great Lakes, the eastern half of the Ohio Valley, the South, much of Texas, lower Mississippi Valley, the eastern Dakotas, central and southern Rockies, the Southwest, scattered locations in California, and most of the remainder of Alaska. Little or no precipitation was recorded in the Tennessee Valley, the southern and western sections of the Ohio Valley, western Dakotas, northern Rockies, the Far West, the extreme northern Alaska, and the remainder of the Hawaiian Islands.

Unseasonably warm weather was limited mainly to the Far West (Table 2). Weekly departures between +4°F and +6°F were recorded from southern Nevada to central Washington. Unusually warm weather with weekly departures to +4°F also prevailed across extreme southern Texas, southern Florida, and northern Pennsylvania. Near to slightly above normal temperatures were common from the central Gulf Coast northeastward along the Appalachians to southern New England, the central Plains, parts of the northern Rockies, Southwest, most of California, extreme western Alaska and most of the Hawaiian Islands.

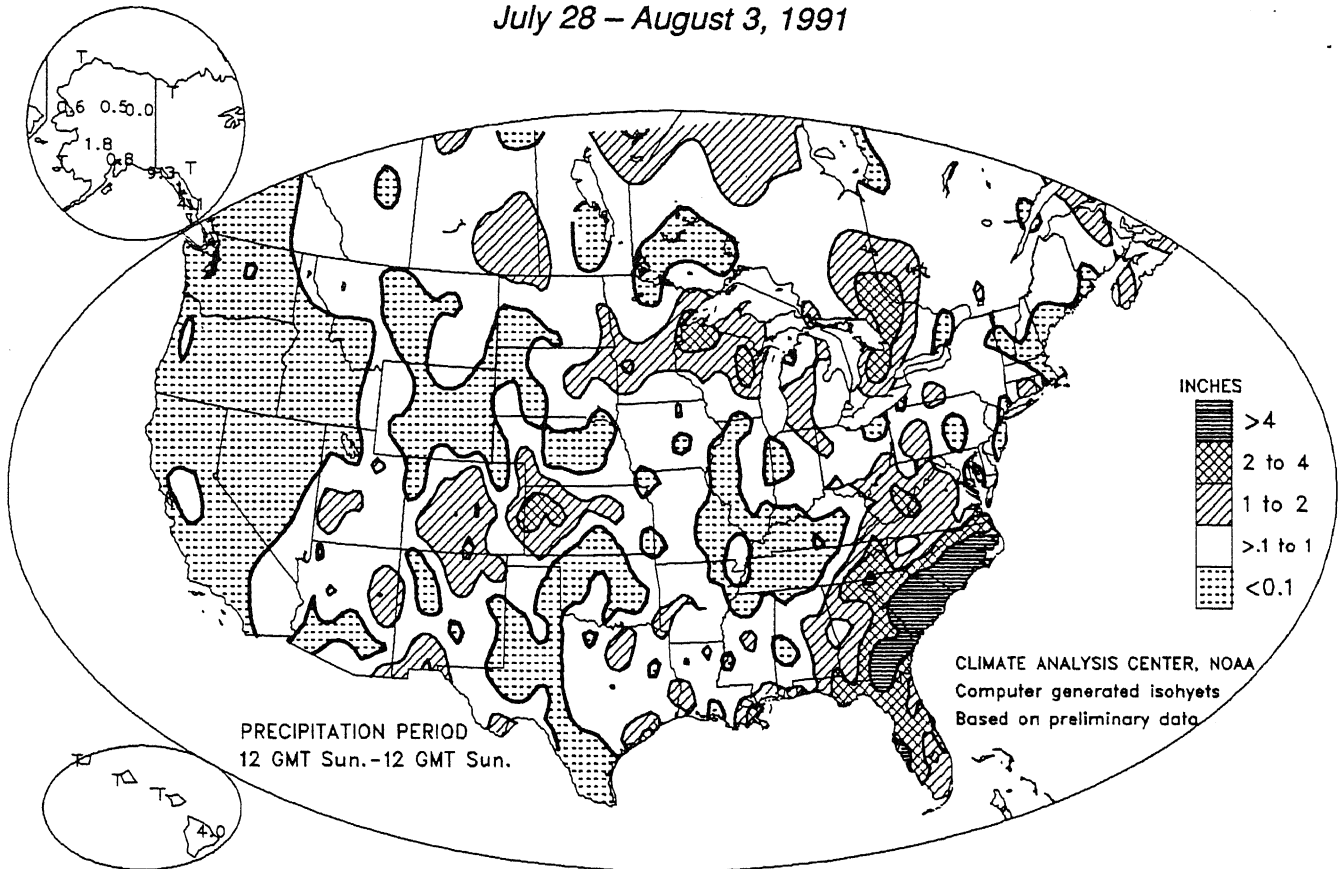
Cooler than normal conditions dominated a large portion of the contiguous U.S. (Table 3). Weekly departures between -4°F and -6°F were observed in the upper Midwest and Great Lakes while departures down to -4°F affected the Southeast, mid-Atlantic, southern Rockies and southern California. Near to slightly below normal temperatures were prevalent from the southern Intermountain West, central and southern Rockies, southern and northern Plains, middle and lower Mississippi Valley despite periods of hot weather during the week. Slightly below to near normal conditions were also reported in central New England and across most of Alaska.

TABLE 1. SELECTED STATIONS WITH 3.00 OR MORE INCHES OF PRECIPITATION DURING THE WEEK OF JULY 28 – AUGUST 3, 1991

STATION	TOTAL (INCHES)	STATION	TOTAL (INCHES)
YAKUTAT, AK	9.26	VERO BEACH, FL	3.96
WILMINGTON, NC	8.13	OMAK, WA	3.88
FLORENCE, SC	7.46	JACKSONVILLE/NEW RIVER MCAS, NC	3.71
VALDOSTA/MOODY AFB, GA	6.67	ANNETTE ISLAND, AK	3.64
SUMTER/SHAW AFB, SC	6.40	JACKSONVILLE/CECIL FIELD NAS, FL	3.53
SAVANNAH, GA	5.95	NEW BERN, NC	3.51
GOLDSBORO/SEYMOUR-JOHNSON AFB, NC	5.68	WAYCROSS, GA	3.50
AUGUSTA, GA	4.84	GOODLAND, KS	3.48
CHERRY POINT MCAS, NC	4.39	NEWPORT NEWS, VA	3.27
CAPE HATTERAS, NC	4.31	TAMPA, FL	3.21
COLUMBIA, SC	4.11	CHARLESTON, SC	3.15
HILO/LYMAN, HAWAII, HI	4.04	JACKSONVILLE NAS, FL	3.04

OBSERVED PRECIPITATION

July 28 – August 3, 1991



DEPARTURE OF AVERAGE TEMPERATURE FROM NORMAL (°F)

July 28 – August 3, 1991

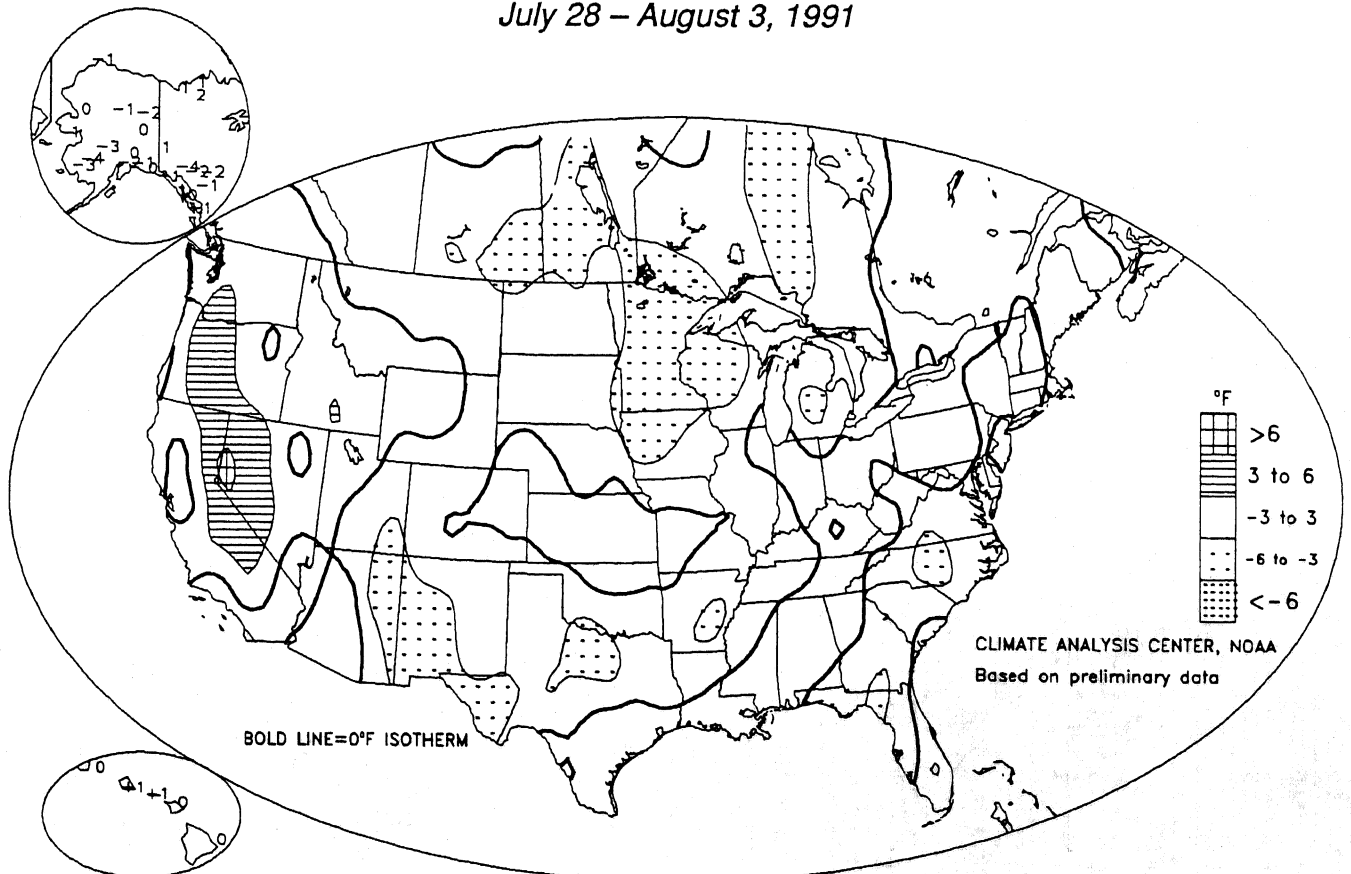


TABLE 2. SELECTED STATIONS WITH TEMPERATURES AVERAGING 2.75°F OR MORE ABOVE NORMAL FOR THE WEEK OF JULY 28 - AUGUST 3, 1991

STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
RENO, NV	+6.5	76.1	STAMPEDE PASS, WA	+3.6	60.6
TONOPAH, NV	+5.4	79.4	BEEVILLE NAS, TX	+3.5	88.3
WINNEMUCCA, NV	+5.3	77.4	PHOENIX, AZ	+3.4	95.5
REDMOND, OR	+4.5	70.9	BLANDING, UT	+3.3	76.9
MCALLEN, TX	+4.2	89.2	ERIE, PA	+3.3	73.4
VICTORVILLE/GEORGE AFB, CA	+4.2	83.4	FRESNO, CA	+3.2	84.1
WILLIAMSPORT/LYCOMI, PA	+4.2	77.0	BURLEY, ID	+3.2	74.1
MEDICINE LODGE, KS	+4.0	86.2	SALEM, OR	+3.2	70.3
PORTLAND, OR	+3.9	72.3	BOZEMAN, MT	+2.9	70.1
FT LAUDERDALE, FL	+3.7	86.3	BOISE, ID	+2.8	77.9
LOVELOCK, NV	+3.7	78.8	SEXTON SUMMIT, OR	+2.8	67.4

TABLE 3. SELECTED STATIONS WITH TEMPERATURES AVERAGING 3.5°F OR MORE BELOW NORMAL FOR THE WEEK OF JULY 28 - AUGUST 3, 1991

STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
PARK FALLS, WI	-5.5	61.6	MASON CITY, IA	-4.1	68.1
MINNEAPOLIS, MN	-5.2	68.1	NORTH OMAHA, NE	-4.0	73.6
EAU CLAIRE, WI	-5.0	66.1	ANIAK, AK	-3.9	51.0
WINSLOW, AZ	-5.0	73.6	SAN DIEGO, CA	-3.9	67.7
GULKANA, AK	-4.9	51.8	GREENSBORO, NC	-3.9	73.7
ST. CLOUD, MN	-4.9	65.6	FAYETTEVILLE, NC	-3.9	75.8
DULUTH, MN	-4.8	60.8	ROCHESTER, MN	-3.7	66.7
WARROAD, MN	-4.8	62.7	INTERNATIONAL FALLS, MN	-3.6	62.5
FORT DODGE, IA	-4.7	69.2	JACKSON, MI	-3.6	68.3
WAUSAU, WI	-4.4	65.2	SPENCER, IA	-3.6	69.1
WAYCROSS, GA	-4.4	77.6	DANVILLE, VA	-3.5	75.4

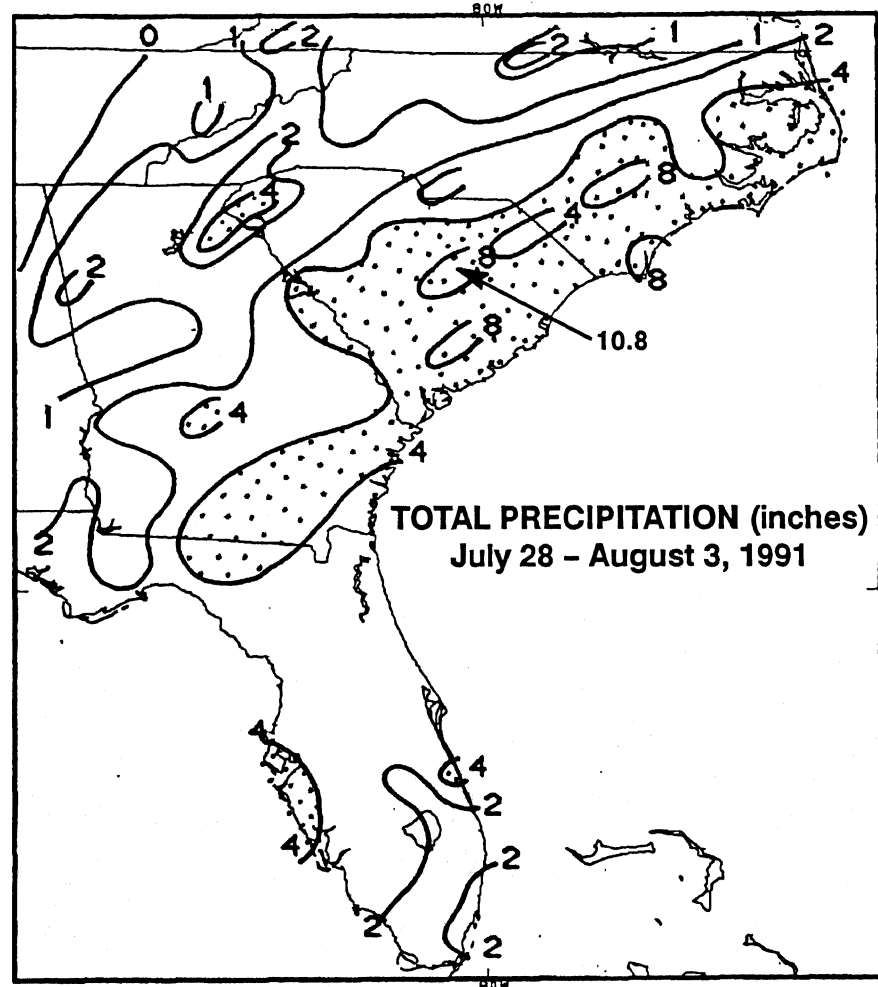
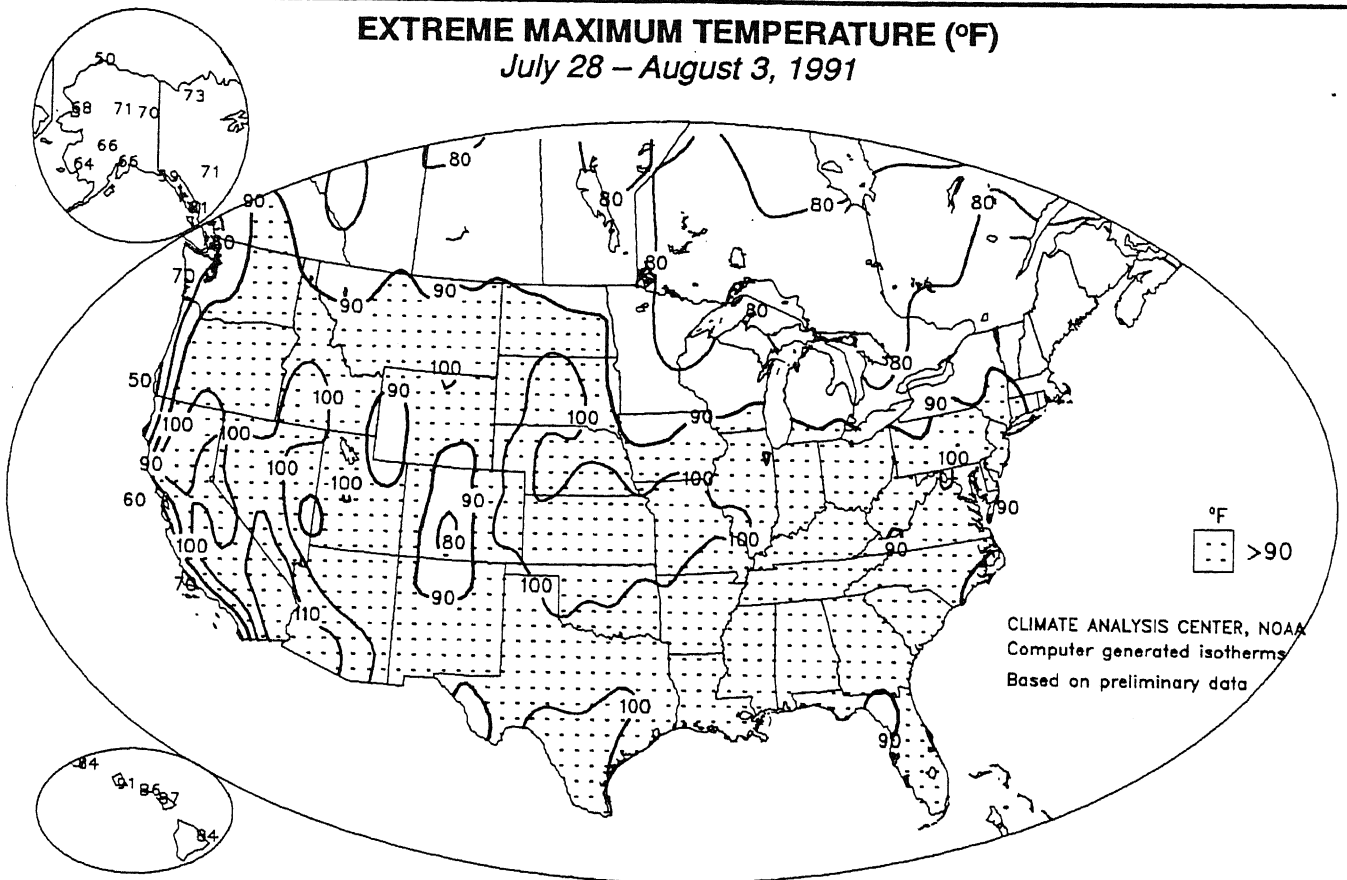


FIGURE 1. *Isopleths only drawn for 0, 1, 2, 4, and 8 inches. Stippled areas greater than 4 inches. Intense thunderstorms, associated with a stalled cold front and a weak tropical disturbance, drenched the Southeast from Florida to Virginia. Parts of the Carolinas were inundated with 8 to 10 inches. Over 7 inches inundated Wilson County, NC in three hours, washing out part of State Road 1123. The rains pushed the July 1991 rainfall total at Columbia, SC to 17.46 inches, making it the wettest month on record.*

EXTREME MAXIMUM TEMPERATURE (°F)

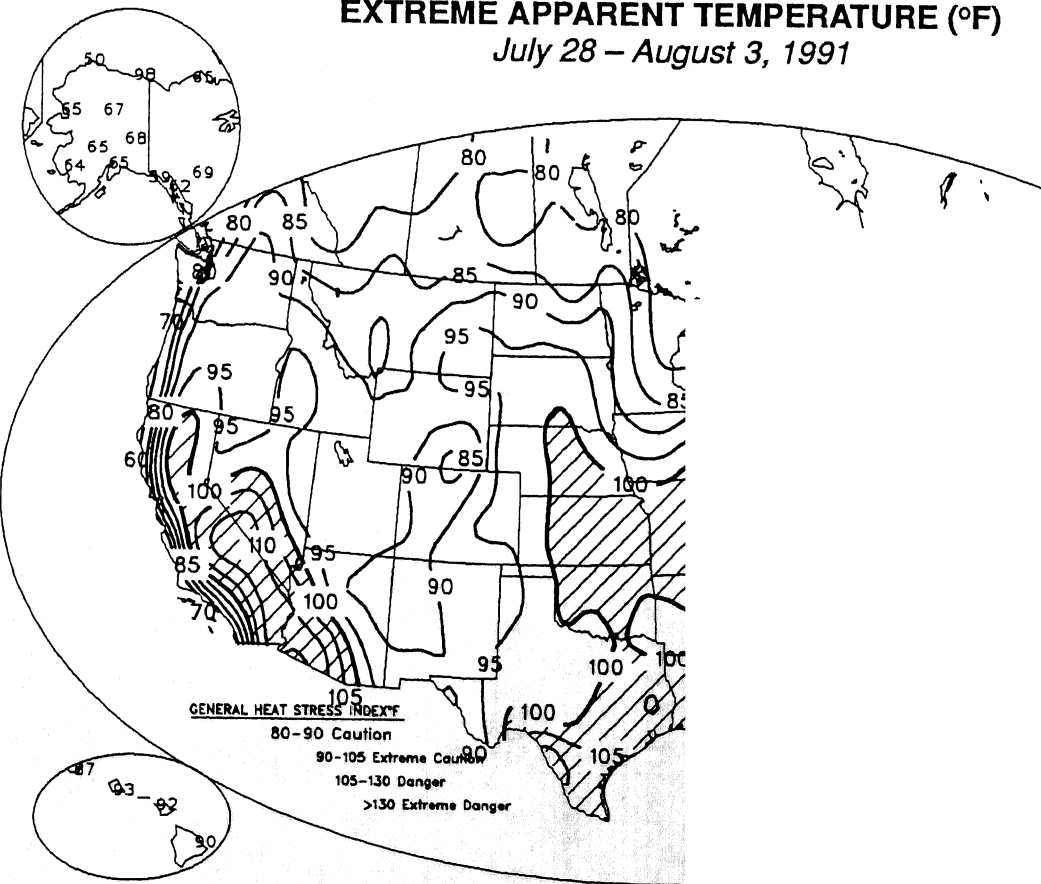
July 28 – August 3, 1991



High temperatures reached into the nineties across much of the nation (top) despite seasonable to below normal temperatures prevailing from the Intermountain West eastward to the Atlantic coast (page 3). Triple digit apparent temperatures, brought on by the combination of hot weather and high humidities, were limited to portions of the central and southern Plains, middle and lower Mississippi Valley, Southeast, mid-Atlantic, desert Southwest, Great Basin, and interior California (bottom).

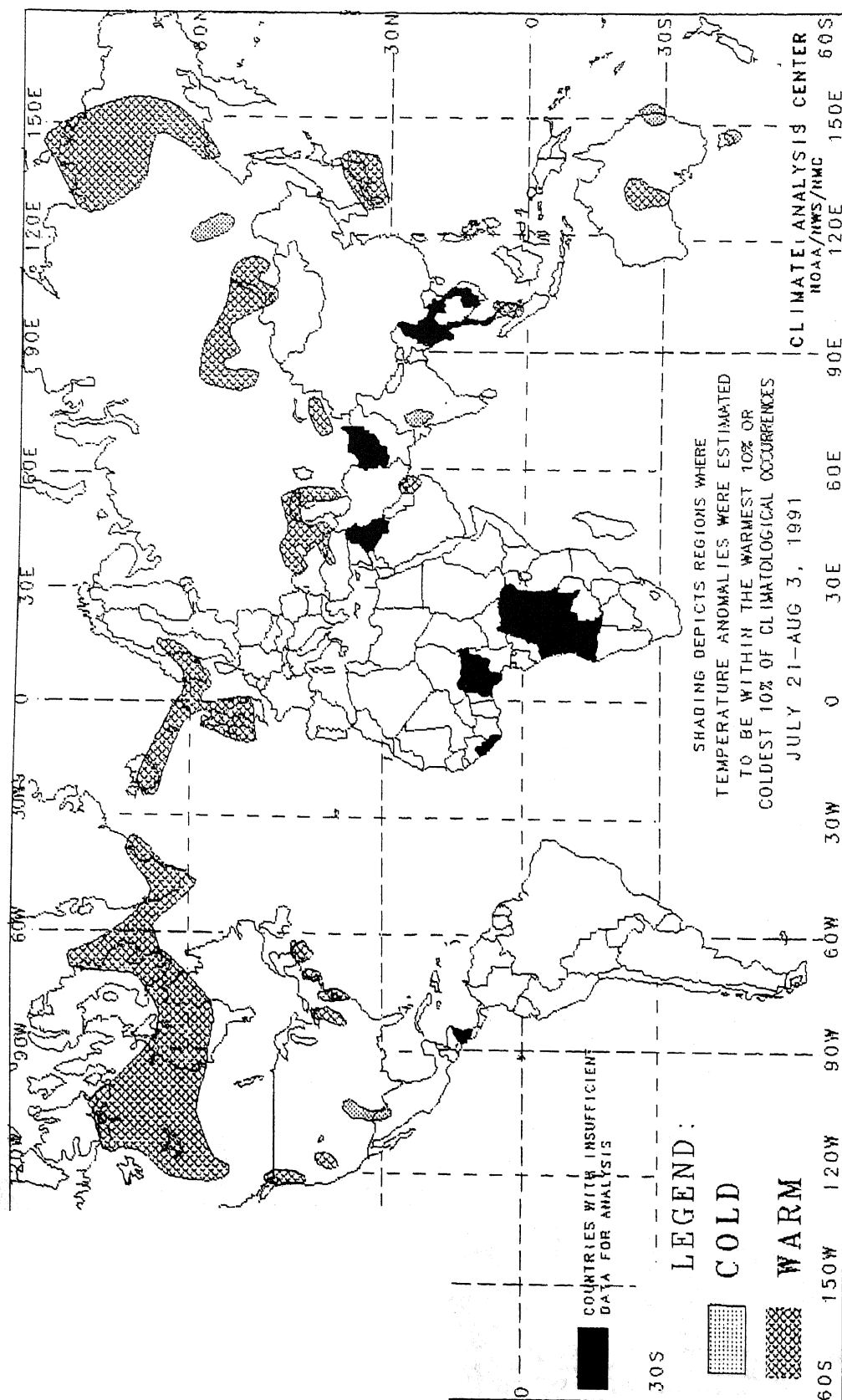
EXTREME APPARENT TEMPERATURE (°F)

July 28 – August 3, 1991



2-WEEK GLOBAL TEMPERATURE ANOMALIES

JULY 21 - AUGUST 3, 1991



The anomalies on this chart are based on approximately 2500 observing stations for which at least 13 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty-four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warm anomalies.

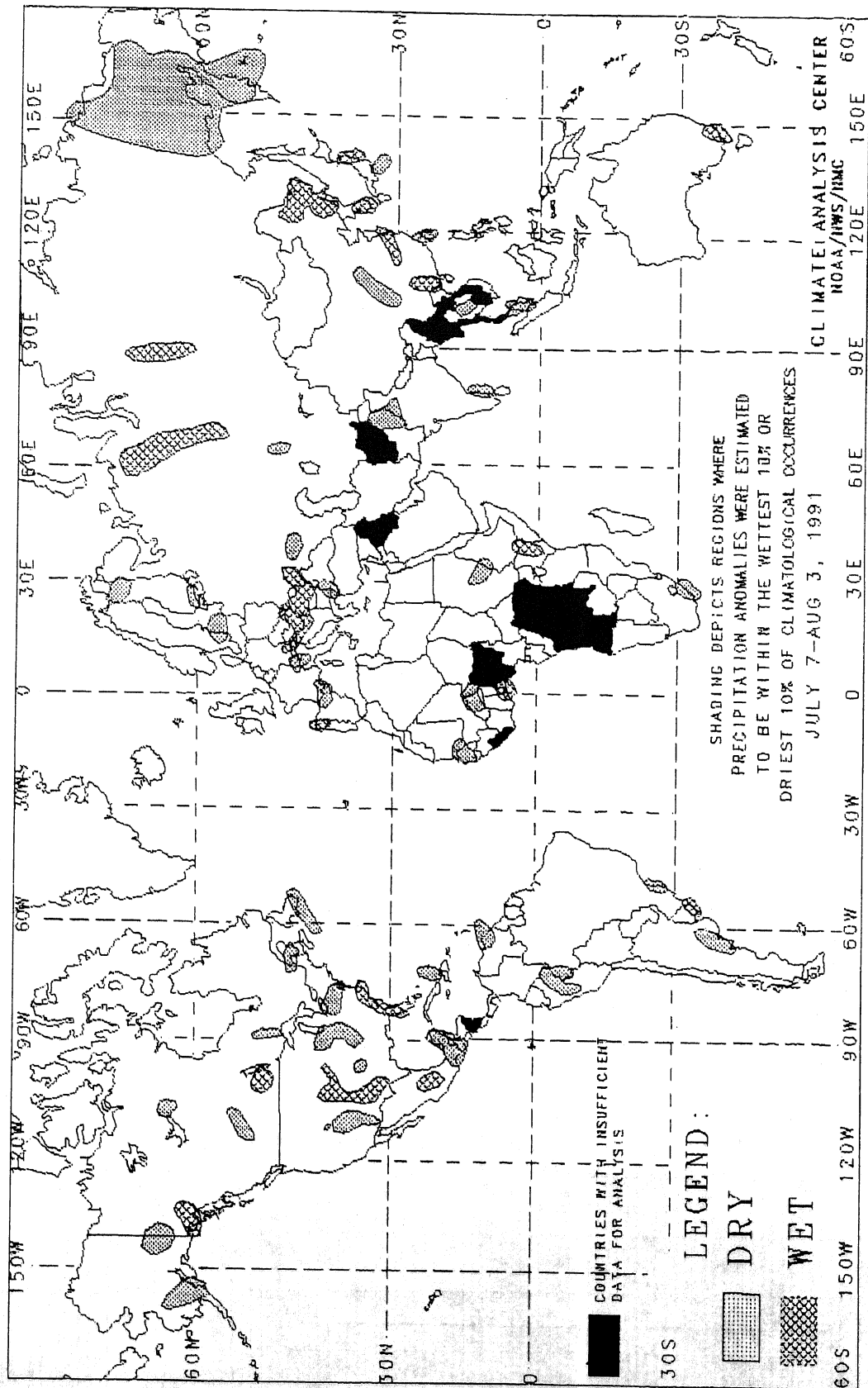
Temperature anomalies are not depicted unless the magnitude of temperature departures from normal exceeds 1.5°C.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

This chart shows general areas of two week temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

4-WEEK GLOBAL PRECIPITATION ANOMALIES

JULY 7 - AUGUST 3, 1991



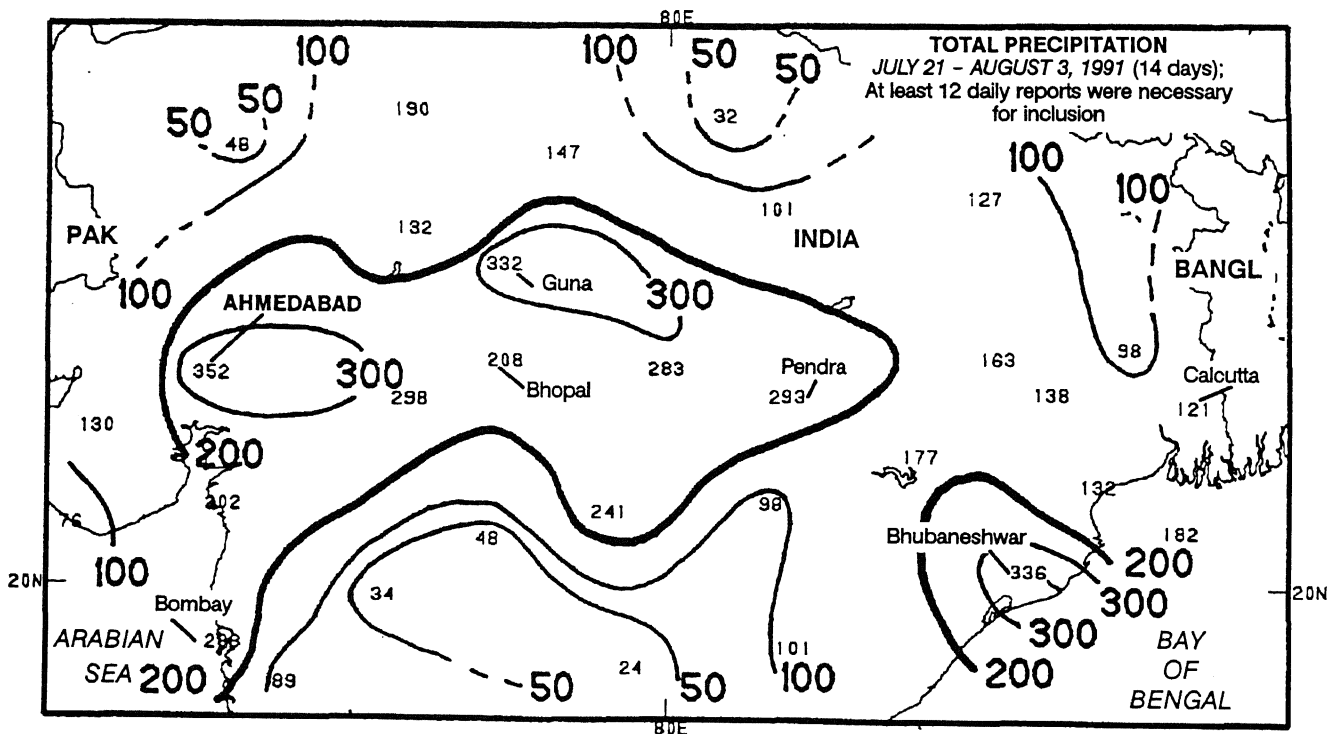
The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the four week period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total four week precipitation exceeds 50 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of four week precipitation anomalies. Caution

GLOBAL CLIMATE HIGHLIGHTS FEATURE



After a slow start to the 1991 monsoon across central and western India, torrential downpours have inundated much of central India from the northwestern Bay of Bengal coast westward into Eastern Gujarat during the last two weeks. According to press reports, more than 10,000 individuals were left homeless and several hundred people lost their lives as a number of rivers, including the Wardha River in Maharashtra's Nagpur region, swept out of their banks and engulfed numerous villages.

